

JUNYANG CAI

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EDUCATION

University of Southern California
Ph.D. in Computer Science

Los Angeles, CA
Starting Aug 2023

- Advisor: Bistra Dilkina

Bucknell University
B.S. in Computer Science & Engineering; B.A. in Mathematics

Lewisburg, PA
Aug 2019 - May 2023

- Overall GPA: 3.98 / 4.0
- Recipient of 2022 Ciffolillo Healthcare Technology Inventors Funding
- Member of Omega Rho, Pi Mu Epsilon Honor Society

PUBLICATIONS

1. **Junyang Cai***, Nguyen Nguyen*, Nishant Shrestha, Aidan Good, Ruisen Tu, Xin Yu, Thiago Serra. Getting away with more network pruning: From sparsity to geometry and linear regions. *International Conference on the Integration of Constraint Programming, Artificial Intelligence, and Operations Research (CPAIOR)*. 2023.
2. **Junyang Cai**, Christopher M. Haggerty, Joshua V. Stough. Co-Unet-GAN: a Co-Learning Domain Adaptation Model on Echocardiography Segmentation. *Proceedings Volume 12464, Medical Imaging 2023: Image Processing; 124641B*.

* equal contribution

RESEARCH EXPERIENCE

Modeling Carceral Algorithms for Pennsylvania Prison System
Supervised by Professor Nathan Ryan, Bucknell University

Mar 2022 - May 2023

- Implemented sequence alignment algorithm with non-uniform time and distance intervals and applied the algorithm to analysis similarity between prisoners.
- Performed network analysis and made predictions of parole decisions based on movement information and personal data of prisoners.

Pruning Neural Networks Based on Linear Regions
Supervised by Professor Thiago Serra, Bucknell University

Jan 2022 - May 2023

- Analyzed ways of pruning neural networks to increase their accuracy.
- Studied faster ways to approximate the linear regions in the neural networks and construct the upper bounds formula of linear regions for pruned networks.
- Performed neural network pruning based on the sparsity arrangement that leads to the highest upper bound and achieved better accuracy in both fully connected and convolutional neural networks.

Domain Adaptation on Echocardiography Segmentation

Sept 2021 - Feb 2023

Supervised by Professor Joshua Stough, Bucknell University

- Used Convolutional Neural Networks to automatically segment echocardiography images, which can provide useful information and guide doctors to detect heart diseases.
- Trained the segmentation network and an image translation generative adversarial network (GAN) together to generalize performance across domains given supervised data only in the source domain.
- Obtained mean absolute error of 9.67% on our model outperforms a previously published model.

Named Entities Recognition of Epitaphs in the Song Dynasty

Sept 2021 - May 2022

Supervised by Professor Song Chen, Bucknell University

- Developed methods based on computer platforms to reduce the substantive work of human annotators when dealing with historical documents.
- Applied regular expression to extract kinship relationships from epitaphs. Developed algorithms and implemented node disambiguation using born place and death year information.
- Built a two-mode network to analyze the different families and their relationships in Song Dynasty.